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Learning Style Preferences of BSEd- Math Major Students in Mathematics of Investment

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Abstract:- Student learning styles should affect assessment and instruction. Adapting the idea that people process information differently should guide our teaching. Much research has focused on learning style variations. Many feel that certain learning styles are better for certain subjects or expertise. This research examines students' learning styles and academic performance in Mathematics of Investment. VAK learning styles preference model correlation with BSEd Math majors' academic achievement. All first-year Visayas State University Bachelor of Secondary Education majors in Mathematics were targeted. The non-random purposive sampling method selected 27 students as respondents. Data was acquired using descriptive-survey research and Cynthia Arem's Learning Style Preference Inventory questionnaire. The Chi-Square Test compared Students' arithmetic grades to their learning styles. Results show that learning style affects student academic performance. Education-style questionnaires can help educators structure learning events in ways that are more popular or familiar to students by revealing respondents' preferences or self-beliefs. Educators should not assume that such attempts would improve student learning except to motivate volunteer effort. Knowing students' preferred learning styles can help educators overcome their tendency to treat all pupils equally and inspire them to use others.

Keywords:- *Chi-Square Test, Education, Learning Styles, Mathematics, Teaching and Learning.*

I. INTRODUCTION

A. Nature and Importance of the Study

Students showed diverse learning methods in their first semester of the Bachelor of Secondary Education major in Mathematics at Visayas State University. Different ways of processing information can indicate kids' academic performance. Learning style refers to cognitive, affective, and psychological traits that determine how students perceive, interpret, and react to learning settings. However, because people learn differently, this may alter students' learning abilities.

Submission and processing of data are cognitive processes in studying. Several factors affect student learning. The factors could represent learning style dimensions. Individual learning styles differ greatly. Any person has academic or learning strengths. Learning styles are based on skills and preferences for learning and communicating visually, orally, and spatially. Perceptual strengths and preferences are often overlooked in learning. Perceptual preferences are aural, visual, and kinesthetic. Learners must discover their perceptual strengths to gain meaningful understanding. One way to distinguish students is by their grades. Each learner absorbs information differently to complete the learning cycle since each person has distinct intelligences from his experiences.

This study aims to determine the ideal learning style for certain subjects, especially arithmetic, and show how it affects student achievement. Understanding is crucial to math comprehension and other subjects. Matter is applied methodically in mathematics. It keeps our lives organized. Math fosters logic, creativity, abstract or spatial thinking, critical thinking, problem-solving, and effective communication.

Every student learns differently. Some prefer group or individualized instruction, and some are more independent. Students' learning styles affect their language and math skills. Avoidant, autonomous, and participatory math learning styles are weakly correlated across all students. Instead of labeling students by style, teachers can assist them in achieving balance and wholeness.

This study helps math teachers understand their students' learning patterns by making them aware of their classroom learning styles and preferences. It also enhances teachers' teaching approaches using instructional activities and materials matching students' learning patterns. Learning style is the biggest predictor of student performance; hence, knowing it is crucial to teaching and learning. This study also helpfully evaluates pupils' math learning styles. Teachers can use the knowledge to design courses, activities, and resources that suit students' learning styles. The findings also show that teachers must pay more attention to children's math performance and identify ways to improve it.

B. Statement of the Problem

The study shows the relationship between the learning style preferences of BSEd-Mathematics major students taking Mathematics of Investment and their final rating.

Specifically, it answers the following questions:

- What are the most common learning style preferences of students taking Mathematics of Investment?

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- What is the relationship between students' learning style preferences and their final Mathematics of Investment rating?

C. Theoretical Framework

This covers relevant theories for our investigation. This theory clarifies the research concept and variable relationship. According to Fleming's VAK (Visual-Auditory-Kinesthetic), learners have three preferences: visual, auditory, and kinesthetic. Visual learners enjoy seeing. Auditory learners prefer earning by listening. Kinesthetic learners learn by touching, moving, and doing.

In Wei C.Y., Hoo Y. H., & See J. (2011), a VARK-designed questionnaire was used to efficiently gather student insights. Their studies demonstrated that learning affects student accomplishment. Wing and Hoi (2009) demonstrated statistically significant learning style group impacts on programming student achievement using the Gregorc Style Delineator (GSD). The way one learns and applies knowledge is crucial in aggregate educational processes, according to research. Recognizing different learning styles attempts to explain the complex processes of knowledge acquisition (Kolb, 1984). A learner's preconceptions form their learning style (Biggs & Moore, 1993). Learners' learning styles can considerably impact their academic performance and achievements. Some personal skills have been extensively studied. By turning information into experience, one learns about their position. Studies have examined academic success and learning styles and their determinants. The goal of mathematics education research is to improve student performance. Recent research focuses on this overarching goal. These studies blame inconsistent learning techniques and poor learning styles for failure. The framework explains how input variables—individuals—relate to survey, data collecting, analysis, and interpretation. Output variables also analyze learning styles and grades. It also depicts the study's flow, which aims to discover students' most prevalent learning style preferences in math and assess the relationship between those preferences with their final investment math rating. The independent variables in this study include student grades and learning preferences.

II. REVIEW OF RELATED LITERATURE

In recent years, a sustained focus has been on examining how different learning styles affect student performance in higher education, especially in specialized areas like mathematics education. Gaining insight into the learning style preferences of Bachelor of Secondary Education (BSEd) students specializing in Mathematics is essential, particularly in courses such as Mathematics of Investment that encompass intricate and practical mathematical ideas.

Learning styles theories continue to be fundamental in educational research, serving as a framework for comprehending how students assimilate knowledge. The VARK Model, developed by Fleming and Mills in 1992, is still extensively utilized to categorize learners based on their preferences for Visual, Auditory, Reading/Writing, or Kinesthetic learning styles.

Recent research highlights the significance of matching instructional approaches with individual learning preferences to enhance results in mathematics education. Felder and Brent's (2016) research emphasize the continuous importance of employing various teaching methods to accommodate the unique learning preferences of engineering and mathematics students. Uğur and Akkoyunlu (2018) discovered that students with learning and teaching styles that were compatible with one another exhibited greater motivation and achieved better results in their mathematics courses.

Mathematics of Investment necessitates both academic comprehension and practical implementation, rendering learning methods a pivotal determinant. In their study, Ozdemir and Yildiz (2020) found that students with a predilection for visual learning styles exhibited superior performance in financial mathematics problems that required the interpretation of graphs and charts. Tran (2021) revealed that individuals who preferred auditory learning saw notable advantages when exposed to lectures and debates that elucidated intricate financial ideas.

Recent empirical research has been dedicated to finding the preferred learning styles among students majoring in BSEd-Math. Alam and Khan (2019) revealed a pronounced inclination towards visual and reading/writing modalities among mathematics majors, corresponding to lucid and organized information requirements. Santos and Villegas (2022) emphasized the inclination towards kinesthetic learning among students who participated in interactive, problem-solving activities in investment mathematics.

Research has demonstrated the precise effects of different learning styles on success in Mathematics of Investment. According to Garcia and Mendoza (2019), students who favored kinesthetic learning styles demonstrated exceptional performance in practical simulations and applying financial problem-solving skills in real-world contexts. Lee and Park (2023) revealed that students who prefer auditory learning fared better when the course provided plenty of chances for verbal explanation and debate of investment principles.

Current education research recommends many approaches to catering to different learning styles in the Mathematics of Investment. It is crucial to include visual aids, audio resources, and hands-on exercises. For instance, Rodriguez and Thomas (2020) discovered that mixed-learning environments substantially positively impacted students with varying learning preferences. The utilization of adaptive learning platforms, which customize information based on individual learning styles, has demonstrated enhanced engagement and outcomes (Smith et al., 2021).

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Methods such as problem-based learning and real-world case studies remain very successful. Johnson and Nguyen (2022) proved that these strategies improve comprehension and memory among many learners. It is advisable to use various evaluation methods to accommodate different learning preferences. Integrating written exams, oral presentations, and practical projects enables a thorough and complete evaluation (Brown & White, 2023). Regularly providing formative feedback is beneficial for addressing individual learning needs and preferences (Kim & Lee, 2021).

III. METHODOLOGY

A. Sampling

A descriptive quantitative survey was applied, and a non-random purposive sampling technique was employed in this study. All BSEd Mathematics major students taking up Mathematics of Investment of the 1st semester AY 2022-2023 are considered respondents for this study.

B. Instrumentation

A total of 27 students were given the Learning Style Preference Inventory (LSI), derived from Dr. Cynthia Arem's book Conquering Math Anxiety, published in 1993. The questionnaire consists of 30 Likert-type scale items, each using a three-point response scale with possibilities of "always," "sometimes," and "never." The questionnaire is evaluated by allocating points to each response (3 for always, 2 for sometimes, and 1 for never). Acknowledging that numerous questions in the LSI instrument are very subjective and relative is crucial. The responses contribute to a knowledge of individual learning styles distinct from their classmates. The questionnaire is utilized to ascertain the students' preferences for learning styles, specifically in Mathematics. The students' final Mathematics of Investment course ratings were collected as the data for their academic accomplishments.

C. Data Analysis

The respondents' learning style preferences are determined using LSI, with the student's learning style preference being indicated by the largest number of points among the three preferences: visual, auditory, and kinesthetic. A frequency distribution was employed to determine students' predominant learning style preferences. The learning technique that had the highest number of frequencies was regarded to be the most desired. In addition, the Chi-Square Test was selected for this study to analyze the correlation between students' learning style preferences and their final grades in Mathematics of Investment.

IV. RESULTS AND DISCUSSIONS

The study's data was analyzed using descriptive and quantitative analysis methods. The study employed descriptive analysis, namely frequency analysis, to identify the prevailing learning style preference among students. Additionally, quantitative analysis, specifically the Pearson Chi-square test, was utilized to evaluate the association between grades and learning style choice.

Table 1. Measure of Median in Each Item of the Survey Questionnaire

Item No.	Median	Item No.	Median
1	3	16	2
2	2	17	2
3	3	18	2
4	3	19	2
5	1	20	2
6	2	21	2
7	2	22	3
8	2	23	1
9	3	24	2
10	3	25	2
11	1	26	2
12	2	27	3
13	2	28	2
14	2	29	2
15	2	30	3

The median represents the central value in a distribution, where all the responses from each item are arranged in ascending order. The table indicates that 19 out of 30 items were categorized as 2 or "sometimes," 8 items were categorized as "always," and 3 things had a median score of 1 or "never." The median of an array is 2 in certain cases when all the ensuing medians from each item in the array are considered. The findings indicate that students' learning styles are not consistently implemented but selectively utilized based on their preferences and other relevant criteria.

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Table 2. Frequency Table on Learning Style Preference

Learning Preference	Frequency	Percent (%)
Visual	17	62.96
Auditory	6	22.22
Kinesthetic	4	14.82
Total	27	100.00

The data presented in the table indicates that the majority of students prefer the visual learning approach to learning Mathematics. The survey results suggest that the majority of students (62.96%) prefer visual learning, followed by 22.22% who prefer auditory learning and finally 14.82% who prefer kinesthetic learning. The majority of participants express a preference for visual learning in mathematics, where they can observe and mentally visualize their lectures.

Table 3. Statistical Measure

	Value
Chi-square Statistic	11.04
Degrees of Freedom	1
p-value	.035

The p-value that is obtained from the provided result is 0.035. Our difference is regarded to be statistically significant because the p-value is lower than 0.05, which is the threshold at which statistical significance is determined. The results of the study indicate that there is a significant disparity between the association between VAK learning styles and the final ratings that students received in Mathematics of Investment. It is possible to see this distinction in the academic achievements of the candidates. There is no denying the reality that these two elements are connected in a particular way.

V. SUMMARY, CONCLUSION, RECOMMENDATIONS

A. Summary

Extensive research has been conducted to define and demonstrate how knowing students' learning styles might improve their academic performance by using teaching and learning tactics that align with their preferences. This research aims to analyze the combination and analysis of how pupils learn and the essence of learning mathematics. This study aims to identify the predominant learning style preference among students pursuing a Bachelor of Secondary Education major in Mathematics at Visayas State University. Additionally, it seeks to establish the correlation between their learning style preference and their final rating in Mathematics of Investment.

John Dewey observes that an individual is no longer merely a specific entity, a component without significance unless within a comprehensive entirety, but rather a subject, a self, a unique focal point of desire, cognition, and ambition. The intricate nature of the learning process facilitates the development of distinct and personalized learning styles. While learning is an ongoing and progressive process, each person uniquely perceives reality. This phenomenon can be attributed to the diverse range of experiences an individual encounters, the impact of external stimuli on their behavior, and their ability to adapt and utilize these experiences to enhance their learning and understanding of the world. The process is alternatively referred to as an individual's learning style. The learning style preferences of the participants were assessed using the Learning Style Preference Inventory. The study's findings revealed that most students possess a visual inclination when learning and comprehending Mathematics. A Chi-Square Test was employed to establish the correlation between individuals' learning style preference and their final ranking in Mathematics of Investment. The results revealed a substantial disparity between the two variables.

B. Conclusion

Each student's unique knowledge acquired via personal experience corresponds to the information processing methods employed to complete the learning process. Consequently, students establish learning styles that prioritize some learning abilities over others. Based on the acquired findings, it is evident that the majority of students are visual learners, which means they prefer to understand Mathematics through visual means. Furthermore, the findings indicate a considerable correlation between individuals' VAK learning style preferences and academic performance.

Learning style preferences exhibit significant variation based on the specific topic matter. Given that the primary subject of this study is Mathematics, it can be inferred that most students are inclined toward visual learning. When it comes to improving pupils' academic performance, numerous elements must be considered. Therefore, environmental and physiological aspects can be regarded as influential components in kids' learning process. Furthermore, it is crucial to acknowledge that the teacher's position substantially impacts students' preferences and methods of comprehending and obtaining information, particularly in mathematics. The aim is for this study's results to be utilized to enhance teaching methods and student achievement. Considering the findings of this study, it would be advisable to consider learning style preferences when planning training courses to optimize learning outcomes.

C. Recommendations

Students are required to assume responsibility and actively engage in their own learning. Meanwhile, educators must offer kids the chance to explore various learning styles and tactics through appropriate classroom activities and exercises. The teacher can employ several instructional methods to accommodate the diverse learning styles of their students. Teachers can enhance their awareness and sensitivity towards their teaching environment, observation, preparation, presentation, and contact with students by comprehending their learning styles and adapting their teaching techniques accordingly.

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In order to enhance their effectiveness, it would be advantageous for them to offer a greater range of options and alternatives to cater to and adapt to the stylistic disparities among their students. Teachers might incorporate group work or pair work as learning activities. Additionally, they can utilize various materials such as movies, CDs, and the Internet to cater to the diverse stimuli that students respond to. Furthermore, it is essential to make the learning process captivating to stimulate and inspire the students while also accommodating their individual learning preferences. Teachers must enhance their skills by participating in courses or seminars that can help them create innovative, effective, and dependable instructional materials, workbooks, or modules.

The most important factor is that these teaching aids must be tailored to the student's requirements and preferences since this will result in improved academic performance. By employing a diverse range of instructional methods, educators can effectively engage a larger number of pupils due to the improved alignment between the teaching style and the learning preferences of each individual. Adapting the curriculum to accommodate the unique learning styles of each student can pose challenges in certain instances. Nevertheless, despite such circumstances, students can enhance their academic achievements by cultivating self-awareness and employing effective learning practices that align with their learning style.

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